

General Services Division
Safety Program and Policy Manual

SUBJECT: Cutting, Welding and Brazing Program

DATE: September 23, 2002

Updated: August 6, 2003

General

CUTTING & WELDING PROCEDURES

These written Cutting & Welding Procedures establish guidelines to be followed whenever employees work with cutting and welding equipment at the South Carolina Budget & Control Board General Services Division. General Services Division personnel perform a wide range of operations and provide services, which commonly require the use of cutting and welding operations that have inherent chemical and physical hazards. The procedures here establish uniform requirements designed to ensure that welding, cutting and brazing safety training, operation, and maintenance practices are communicated to the affected employees and contractors. These requirements also are designed to ensure that procedures are in place to safeguard the health and safety of all employees.

It is our intent to comply with the requirements of 29 CFR 1926.350 through .354 and the General Industry requirements of 29 CFR 1910.252. These regulations have requirements for welding and cutting operations. We also comply with applicable requirements of the NFPA Standard 51B, 1962.

All General Services Division (GSD) employees that perform cutting and welding operations shall be trained as outlined in these procedures to recognize the hazards associated with their work, to be informed of the OSHA Standard CFR 1910.252 and to follow all guidelines recommended by this document. Only authorized persons may cut and weld at the General Services Division. Regular cutting and welding on steel and iron and sporadic short term cutting and welding on aluminum, stainless steel and cast iron may take place at the Welding Shop at 921 Rear Main Street, Columbia, SC and the Welding Station at the Horticulture Shop on Bull Street. Management may authorize other cutting and welding on a case-by-case basis. "Off site" Cutting & Welding Operations shall be authorized by management of the Facilities Management staff. Every "off site" Welding Operation shall have a special permit (see Appendix A). These permits will remain on file in the Building Systems office for a period of 5 years. Any Welding or Cutting shall be done in accordance with the procedures outlined in this program and applicable OSHA standards. GSD will maintain awareness of all cutting and welding operations authorized by its managers and to communicate any associated hazards to employees along with the necessary safety precautions. All visitors and contractors to GSD facilities and job sites shall comply with the GSD Cutting & Welding Program or shall be denied access to these areas when welding is in progress.

STANDARD OR REGULATION:

ANSI Z49.1-1967 *Safety in Welding and Cutting*

CGA Pamphlet P-1-1965 *Safe Handling of Compressed Gases*

29 CFR 1926, Subpart D *Occupational Health and Environmental Controls*

29 CFR 1926, Subpart E *Personal Protective And Life Saving Equipment*

29 CFR 1926.406(c) *Electrical—Specific Purpose Equipment and Installations*

PROCEDURES

GSD employees who are identified to do welding must have had specific training in and be knowledgeable about various means of cutting and welding practices and the procedures set up at the General Services Division to protect employees and facilities. Employees will be selected as “qualified” by the Team Leader based on their previous education, qualifications and job description. They will be referred to as “Authorized” once they have completed the Welding Safety Training course offered by the GSD Safety Office. “Authorized” means an individual who is capable of doing cutting or welding operations, as stated above, and has completed the training required by this program.

1. The Safety Support Staff will monitor compliance with all federal and state regulations governing safety and health protection, including the OSHA Standard CFR 1910.252. This includes:

- Coordinate program;
- Maintain the written General Services Division Cutting and Welding Program;
- Provide required safety training;
- Maintain a list of locations where Welding Operations are authorized.
- Monitor and update GSD Supervisory Welding Operations Permit files

2. Each Team Leader is responsible for health and safety in his or her work area. To carry out this responsibility, the Team Leader will verify:

- That employees know and follow the safety and health guidelines included in the cutting and welding operations training;
- That appropriate personal protective equipment (PPE) is available, in good condition and properly used;
- That employees have proper training for their anticipated job assignments, including use of appropriate PPE;
- That any new hazards introduced into the workplace receive proper health and safety review, and that response plans are developed.

In addition, Team Leaders will identify employees who have had specific training and are knowledgeable about various means of cutting and welding practices and procedures set up at the General Services Division. These employees will be referred to as “Authorized” and may perform cutting or welding operations. “Authorized” persons are able to identify existing and predictable hazards or working conditions that are hazardous or dangerous to employees. “Authorized” persons have authority to take prompt, corrective measures to eliminate these hazards and conditions.

3. Each employee will:

- Read and comply with the GSD Cutting and Welding Program;
- Perform work safely; and
- Be aware of and alert for any unsafe conditions and report those to his or her Supervisor, Team Leader and Safety Support.

4. Training will cover Fire Prevention and Protection, Special Precautions, PPE, and Hot Work in Confined Spaces. All employees subject to performing Welding Operations will complete “Hands on” Fire Extinguisher Training. Employees shall be familiar with all relevant GSD policies regarding Welding Operations and understand regulations governing the practices followed at GSD.

LOCATION

It is the policy of the GSD that “Authorized” persons may perform welding operations only in specific locations which are authorized by management for welding. The following locations have been approved for welding and cutting operations:

- 1) The Welding Shop at 921 Rear Main Street and
- 2) The Horticulture Shop and Welding Booth at Bull Street

These locations shall contain 2 Fire Extinguishers at all times. The only other conditions which welding can occur at the General Services Division are those permitted by this Program (see Appendix A.)

HOT WORK

Work with equipment that produces a spark or an open flame, or a process that generates excessive heat or produces a risk of fire is considered “Hot Work”. Work involving electric or gas welding, cutting, brazing or similar flame producing operations are known as hot work.

Soldering and brazing with an open flame and grinding are considered “Hot Work” in the GSD Cutting, Welding and Brazing Program and the requirements for a Hot Work Permit must be complied with.

Hot work can be controlled through a permit process establishing authorization for all work that produces a spark or extreme heat.

Examples of hazards from hot work are:

Fire, property or personal loss

Explosion of compressed gases

Flammable or combustible vapors, solids, liquids near the area of the hot work

Processes involving oxyfuel, flames on torches

Metal splatter

Torch-based soldering

Confined space issues

Precautions to avoid or minimize risks involved in hot work fall under fire prevention measures, personal protective equipment, and preventative maintenance of specialized tools, warning labels and ventilation.

Hot work permit

The employer must issue a permit for all hot work, with the following exceptions:

- in welding shops authorized by the employer
- in hot work areas authorized by the employer which are located outside of the shops authorized by the employer.

The permit must certify that the requirements contained in OSHA Standard 1910.252 have been implemented prior to beginning the hot work operations. The permit must be kept on file until completion of the hot work operations.

GENERAL WELDING OPERATIONS

WELDING TRAINING

Welding training, provided by Safety Support is to include:

- The types of materials that may be used in welding operations are Steel or Iron. Sporadic short term welding on Galvanized , Aluminum, Stainless Steel, or Cast Iron is also permitted.
- The correct procedures for inspecting, setting up and disassembling welding equipment away from the Building Systems shop to work under a "Hot Work Permit."
- The correct procedures for preventing fires.
- The proper procedures to remove lead based materials from the surfaces of cast iron, iron or steel and galvanized.
- Galvanized will require that employees remove the galvanized particles from the spot to be welded before commencing work.

Training will include a Video covering welding operations. The video will explain the hazards of employees who perform welding operations. In addition, Safety Support will conduct an Instructor Led class explaining the specific operations of the General Services Division for welding operations.

"Authorized" employees shall fully understand the hazards and means of protection before performing any welding. The following work areas are identified as hazardous when employees work away from their designated work area (shop.)

- Confined Spaces
- Areas where combustibles cannot be removed or covered for 35 feet in every direction

- Areas which cannot be mechanically ventilated.

PERSONAL PROTECTIVE EQUIPMENT

Personal protective equipment should always be used along with, but never instead of, engineering controls and safe work practices.

Eye protection

Eye protection should be used for all welding operation to protect the eyes from bright light, heat, ultraviolet light and flying sparks. Face shields, helmets and goggles are required to keep slag and particles out of the eyes.

Welding helmets, goggles or other eye protectors must contain special filter plates or lenses for workers exposed to arc welding or cutting processes, oxyfuel gas welding brazing or cutting. The OSHA welding standard requires that employees performing welding and cutting operations shall be protected with filter lenses or plates as specified in Filter Lens Shade Numbers shown as Appendix B of this Program. Use of eye protection with auto-darkening module for lens is acceptable.

MSD Sheets may determine use of PPE. Protective clothing is selected, based on exposure to hazards. Protective clothing which may be required during cutting and welding (by welders and nearby workers) includes:

- fire resistant gauntlet gloves
- head cap
- high-top hard-toed shoes
- leather apron
- faceshield
- safety glasses
- helmets
- leggings
- sleeves and collars should be kept buttoned and pants and shirts should be uncuffed
cap and hard hats may also be required.

Workers should use welding helmets (with appropriate filter lenses), not hand-held screens. When welding overhead, extra protection should be used, such as fire – resistant shoulder covers, aprons, head covers, leggings and suits.

Welding should be done where ventilation is adequate so as not to expose employee to toxic substances. GSD employees will not perform welding or cutting where respirators are required by MSD sheets except in cases involving sporadic short term projects.

LEAD AWARENESS

Employees shall be trained in the GSD Lead Work Practices. If lead is suspected, the GSD Lead Process will be followed.

MSDS SHEETS

MSDS (Material Safety Data Sheets) must always be reviewed prior to conducting cutting and welding operations. Employees shall assure that every item surrounding the cutting and welding operations has an MSD sheet. This includes any item that is to be welded on or welded with. MSD sheets must be readily available.

FIRE PREVENTION DURING WELDING OPERATIONS

Welding and metal cutting operations produce molten metal, sparks, weld spatter, slag and hot work surfaces. All of these can create a situation that can cause fires. At 1910.252 General requirements, OSHA addresses fire hazards and the methods, which can be used to control them. GSD employees shall follow these practices.

FIRE WATCH AND SUPERVISION OF OFF SITE WELDING OPERATIONS

When cutting and welding operations take place off site of the fixed welding facilities, located at 921 Main Street and the Horticulture Shop at Bull Street, Management must authorize each operation. Management will authorize a "Fire Watcher" who will be responsible for having available proper fire extinguishers for the exposures.

Fire Watchers are additional personnel who:

- provide additional safeguards against fire during and after the welding, cutting , or heating operations.
- must be trained on the specific fire hazards for that job and location and know where fire prevention equipment is located and how to use it.
- fire extinguishing equipment must be on hand, and readily available for use.

it will be the responsibility of the "Fire Watcher" to use the Fire Extinguisher, in case of an emergency and to summon help if needed.

A fire watcher is required in situations where:

- other than a minor fire might develop
- combustible material is located within 35 feet of the work.
- combustible material is located more than 35 feet away but can be easily ignited by sparks.
- wall or floor openings within 35 feet expose combustible material in adjacent areas or concealed wall or floor spaces.
- combustible materials are located on the opposite side of surfaces being welded.

Fire watch follow up:

The fire watch is to be maintained for at least 30 minutes following completion of the work.

Welding Operations will not take place in the event that existing Fire Suppression systems (sprinkler systems) are inoperable without express written authorization from the Safety Support Office (BEEPER: 954-7233).

Appendix A

08/30/02

Off Site Welding Operations Authorization Form GSD FM Building Systems _____ GSD FM Building Maintenance _____

Date _____ Welding Operation Location _____

Time of Day Operation Began _____ Time Completed _____

Work Order Number: _____ Supervisor Name _____

Welder Name _____ Fire Watch Name _____

1. Checked for Asbestos YES If yes, **STOP!** Do not proceed until the Inspection report is available and communication is established with Supervision.

2. Checked for Lead YES If Lead is suspected, check with Team Leader and follow Lead Program.

3. If gas lines are present, have they been locked out, using LOCKOUT / TAGOUT ? YES NO

4. Material to be welded is Steel, Cast Iron, Stainless Steel, Iron, Aluminum, or Galvanized? (CIRCLE EITHER)

5. Is Mechanical Ventilation used? YES NO

6. Combustible material - Checked 35 feet in every direction for Combustible material. YES NO

7. If Combustibles were present, were they covered with Fire Covers? YES NO

8. Two Fire Extinguishers present: YES NO

9. If Fire Alarms are present, are they in working order? YES NO

10. If Smoke detectors or smoke duct detectors are present, are they disabled? YES NO

11. Checked Staff for PPE ? YES NO

12. Checked Equipment for Safety YES NO

Supervisor Authorizing Operation: _____ **Date:** _____
(Signature)

This form will be maintained by the GSD Management staff, attached to the work order and made available to OSHA or the GSD Safety Office, upon request.

Appendix B

Filter Lens Shade Numbers for Protection Against Radiant Energy

<u>Welding Operation</u>	<u>Number Shade</u>
Shielded Metal-Arc Welding (SMAW) using 1/16-, 3/32-, 1/8-, and 5/32-inch diameter electrodes	10
Gas-Shielded Arc Welding (nonferrous) using 1/16-, 3/32-, 1/8-, and 5/32-inch D. electrodes	11
Gas-Shielded Arc Welding (ferrous) using 1/16-, 3/32-, 1/8-, and 5/32-inch D. electrodes	12
Shielded Metal-Arc Welding (SMAW) using 3/16-, 7/32-, and 1/4-inch D. electrodes	12
5/16-, and 3/8-inch diameter electrodes	14
Atomic Hydrogen Welding	10-14
Carbon-Arc Welding (CAW)	14
Soldering	2
Torch Brazing	3 or 4
Light cutting, up to 1-inch	3 or 4
Medium cutting, 1-inch to 6-inches	4 or 5
Heavy cutting, over 6 inches	5 or 6
Gas welding (light), up to 1/8-inch	4 or 5
Gas welding (medium), 1/8-inch to 1/2-inch	5 or 6
Gas welding (heavy), over 1/2-inch	6 or 8